

# PATENT ABSTRACTS OF JAPAN

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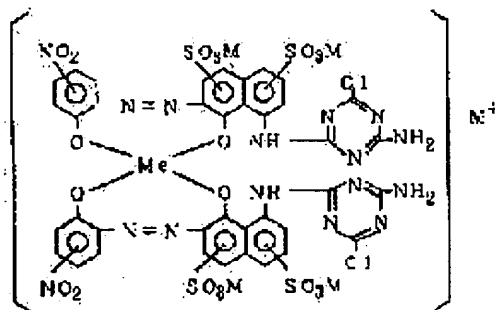
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## (54) INK COMPOSITION FOR INK JET PRINTING

### (57)Abstract:

PURPOSE: To obtain the ink compsn. which contains a dye in a high concn., causes neither thickening nor precipitation of crystals even if stored in a long time, and has been improved in fastness, facing resistance, and reproducibility of dyeing by incorporating a specific reactive dye into the compsn.

CONSTITUTION: The ink compsn. is prepd. by dissolving, in water, 1-50wt.% hydrophilic org. solvent, 1-30wt.% reactive dye of the formula (wherein Me is Cr or Co; and M is Na and/or K) contg. 1wt.% or lower inorg. salt, and, if necessary, 1-30wt.% urea and/or  $\epsilon$ -caprolactam as a dissolution aid.



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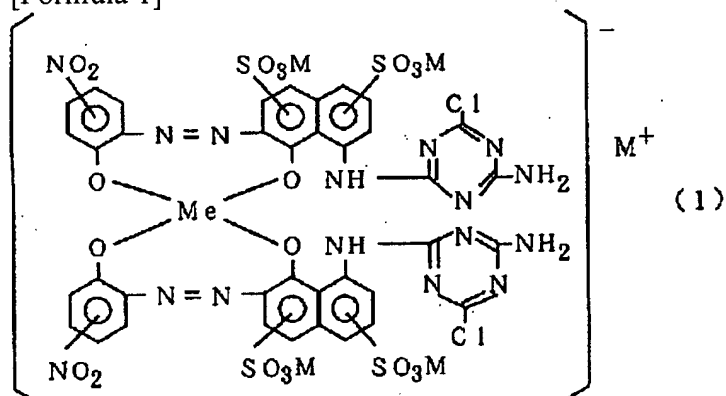
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## CLAIMS

[Claim(s)]

[Claim 1] The ink constituent for an ink jet print of the reactive dye shown by the general formula (1) for fiber which contains a kind at least.

[Formula 1]



(Me expresses a chromium atom or a cobalt atom among a formula, and M expresses a sodium atom or a potassium atom.) Moreover, the mixture of a sodium atom and a potassium atom is sufficient as M.

[Claim 2] The ink constituent for an ink jet print containing water and a hydrophilic organic solvent according to claim 1 [claim 3] The ink constituent for an ink jet print according to claim 1 or 2 which contains a urea and/or epsilon caprolactam 1 to 30% as a dissolution assistant [claim 4] Mineral salt concentration is 1 or less % of the weight of an ink constituent for an ink jet print according to claim 1, 2, or 3.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ink constituent for an ink jet print of reactive dye. Especially, it is related with the ink constituent for an ink jet print suitable for textile printing of the mixed textile fabrics which consist of the textile fabrics which consist of fiber which can be dyed by reactive dye, nonwoven fabrics or these fiber, and other fiber, or a mixed nonwoven fabric like cotton, hemp, a viscose, wool, silk, nylon, etc.

[0002]

[Description of the Prior Art] The so-called ink jet print approach which prints by making a liquid ink drop fly from a minute regurgitation orifice from the former is learned. Various methods are proposed by such printing method. For example, the thing which gives a signal to the printer-head which has piezo vibrator, is made to generate the drop of ink according to this signal, and is printed, Electrostatic attraction of the ink is carried out, electric-field control of the generated drop is carried out according to a signal, and many methods, such as what is made to generate what prints, and the drop by which the amount of electrifications was controlled by the continuation oscillating evolution method, and prints by making between the deflecting electrodes with which this drop was impressed to uniform electric field fly, are learned.

[0003] Such an ink jet printing method makes the drop (droplet) of ink fly, and prints by making this adhere to dyed goods-ed. This ink makes a fundamental component the solvent object (water, various organic solvents, or such mixture are used) which dissolves a coloring material and this, and various additives are added if needed.

[0004] Blinding of the regurgitation orifice is not carried out as desirable conditions for this kind of ink, It has the liquid nature (viscosity, surface tension, electric conductivity, etc.) suitable for the regurgitation, To that physical-properties change or solid content does not occur during preservation, giving the dyed goods-ed of high concentration, and dyed goods-ed, fixation is quick, there are little that that a blot of ink is small and a water resisting property, and lightfastness are excellent, odor, and toxicity, and excelling in safeties, such as inflammability, etc. is mentioned.

[0005] Since the ink applied to the print of this object is fundamentally composed from a color and its solvent as mentioned above, the property of the above-mentioned ink has the large place influenced by the property of the proper which the component used as a color and a solvent object has. Therefore, it is a very important technique in this technical field to choose a color and a solvent object so that ink may possess many above-mentioned properties.

[0006] furthermore, BOD of the wastewater after dyeing which is also a social need from the latest environmental side and a COD burden -- \*\*\*\* -- it is-izing. Although the drastic cutback of printing paste was attained with the ink jet print method, as for the ink side itself, it is desirable for a wastewater burden to be small. That is, there are few additions of various additives and it is a still more important technique that it is desired by high concentration for storage stability to be good over a long period of time, and a color chooses a color, a dissolution assistant, and a solvent object also from such a field.

[0007] Moreover, on an ink jet print, although three primary colors (yellow, red, blue) and black are used, in order to blend and take out a wide range hue, it is usually required that especially three primary colors (yellow, red, blue) should be clear hues. Furthermore, to excel in the dyeing property of the color used in order to print on fiber, for example, dyeing repeatability, various fastness, white field stain resistance, etc. is demanded.

[0008]

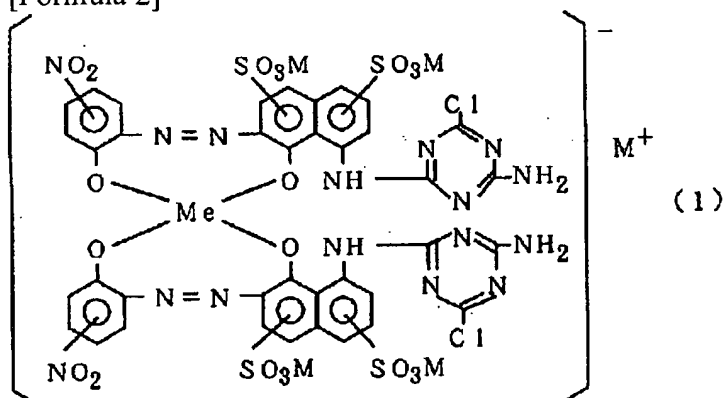
[Problem(s) to be Solved by the Invention] Development of the ink constituent for an ink jet print which it was stable, and was clear and was excellent in the dyeing property to which viscosity lifting, a crystal deposit, etc. are not caused even if there are few additions of various additives, and color concentration is thick enough and it leaves it for a long period of time is desired.

[0009]

[Means for Solving the Problem] this invention persons result in this invention, as a result of repeating research wholeheartedly that a trouble which was described above should be solved. That is, this invention is said formula (1).

[0010]

[Formula 2]



[0011] (Me expresses a chromium atom or/and a cobalt atom among a formula, and M expresses a sodium atom or a potassium atom.) moreover, the mixture of a sodium atom and a potassium atom is sufficient as M -- the reactive dye shown -- at least (related with the ink constituent for an ink jet print containing a kind for fiber (only henceforth an ink constituent).) This invention is explained to a detail below. As a solvent object of the ink constituent of this invention, water or the solvent object which contained ion exchange water and a hydrophilic organic solvent preferably is used at least. A hydrophilic organic solvent must choose what does not bar the solubility of the reactive dye which has the duty which has the effectiveness as a non-dryness agent and prevents generating of a solid material by desiccation, and also has the duty of the viscosity control of an ink constituent, and is shown by the general formula (1) here.

[0012] As a hydrophilic organic solvent, more than kinds, such as nitrogen-containing heterocycle type ketones, such as alkylene glycol; glycerol; N-methyl-2-pyrrolidones, such as polyalkylene glycols; ethylene glycol, such as a polyethylene glycol and a polypropylene glycol, propylene glycol, and a butylene glycol, and 1,3-dimethyl-2-imidazolidinone, can be used as a solvent body constituent, for example.

[0013] Generally let more preferably the content of the above-mentioned hydrophilic organic solvent in an ink constituent be 5 - 25% of range 3 to 40% 1 to 50% by weight % to all liquid ink weight.

[0014] In the ink constituent of this invention, a dissolution assistant can be added so that a color may not deposit in a constituent. In that case, it is good in a constituent 1 - 30% content, and to make it contain 1 to 20% preferably by weight % as a dissolution assistant in a urea and/or epsilon caprolactam.

[0015] Although the color (coloring material) used for this invention is the thing of the structure of said formula (1), generally mineral salt, such as a sodium chloride and a salt cake, mixes at the time of color composition. Furthermore, calcium ion, magnesium ion, etc. which are contained in underwater

[ general ] are mixed with a minute amount. These mineral constituents not only worsen the solubility and storage stability of a color remarkable, but cause corrosion and wear of a printer-head.

[0016] Although it is desirable for approaches, such as an ultrafiltration method, reverse osmosis, and an ion-exchange method, to be used, and to remove mineral as much as possible in order to remove these mineral salt, specification must be set up and managed in practice. Although it is necessary to carry out to at least 1 or less % of the weight, it is 0.1 or less % of the weight more preferably 0.5 or less % of the weight.

[0017] Although it considers as desired color concentration by dilution or concentration after removing mineral, the ink constituent of this invention can contain a part for 1 - 30% of the weight of a color, and its 5 - 25 % of the weight is desirable in practice. After being prepared from such a component, dust and a foreign matter, and in order to remove insoluble matter in addition to this, liquid filtration is carried out using the filter aid of a cellulose type, then, precision filtration is carried out with a membrane filter (1 micron of apertures), and precision filtration is further carried out with the membrane filter of 0.45 microns of apertures.

[0018] Thus, especially the prepared ink constituent for an ink jet print of this invention is excellent in stability and mothball nature also in various properties, and characteristic in respect of not carrying out blinding of the regurgitation orifice etc. In addition, when adding the stabilizer (the sodium polyacrylate by Nippon Kayaku Co., Ltd., for example, the KAYAKIRE-TA-C-1000 grade), and an antimicrobe and antifungal agents of a coloring material (for example, DERUTOPPU by Takeda Chemical, Ltd. etc.), it is good to add in the phase before carrying out precision filtration.

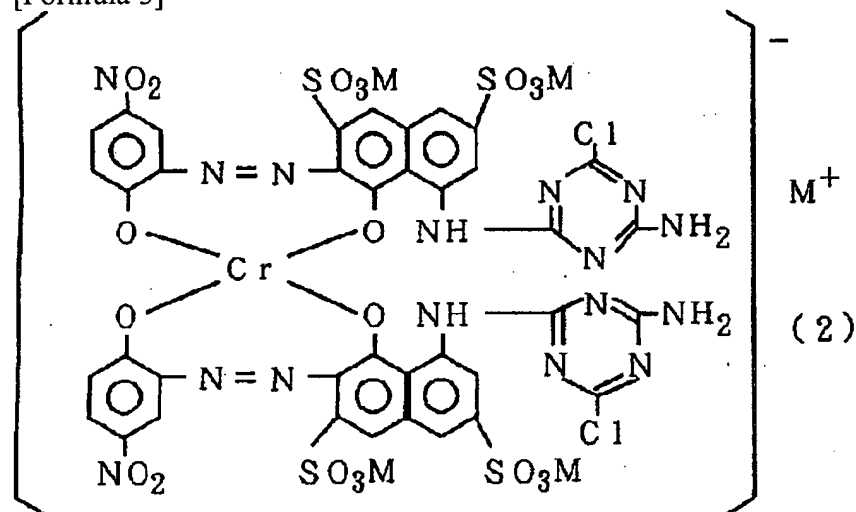
[0019]

[Example] Although an example explains this invention concretely, this invention does not limit only to these examples. In addition, there are weight criteria among a sentence with the section and %.

[0020] The following type which compounded by the general approaches, such as example 1 diazotation and coupling, and was obtained (2)

[0021]

[Formula 3]



(MはNaとKの混合)

[0022] It comes out, after adjusting pH of 20 \*\*\*\*\* reaction mixture to 6-8, liquid filtration of the reactive dye shown is carried out, and insoluble matter is removed. Next, it desalts by reverse osmosis, mineral is made into 0.5% or less, and the following object is added in this liquid.

[0023]

Epsilon caprolactam 10 section propylene glycol 5 section sodium polyacrylate After carrying out liquid

filtration of the liquid of 1 \*\*\*\* again, precision filtration was carried out with the 0.45 more-micron membrane filter with the membrane filter of 1 micron of apertures, and it adjusted so that a total amount might become the 100 sections with ion exchange water, and the ink constituent for an ink jet print of this invention was obtained.

[0024] The ink constituent for an ink jet print obtained by this example showed stability with one good month or more also in ordinary temperature or low temperature (0 times Centigrade).

[0025] It applies to example 2 example 1 correspondingly, and it color-compounds, and desalts and the following object is added.

Epsilon caprolactam 10 section propylene glycol 15 section sodium polyacrylate The one section [0026] Precision filtration of this liquid was carried out like the example 1, it adjusted so that a total amount might become the 100 sections with ion exchange water, and the ink constituent for an ink jet print of this invention was obtained. The ink constituent for an ink jet print obtained by this example showed stability with one good month or more also in ordinary temperature or low temperature (0 times Centigrade).

[0027] The ink obtained according to the above-mentioned example was used, and it printed on the broadcloth textiles (mercerization article) of 100% of cotton pretreated with the on-demand mold ink jet printer, and as a result of carrying out steaming for 10 minutes and rinsing and soaping at 100 degrees C after an air dried, the black dyeing object was obtained. The obtained dyeing object was excellent in dyeing repeatability, and excellent also in white field stain resistance.

[0028]

[Effect of the Invention] this invention -- color concentration -- even if saved highly and for a long period of time, a viscosity lifting crystal deposit does not take place, but the stable ink constituent for an ink jet print for fiber is obtained.

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